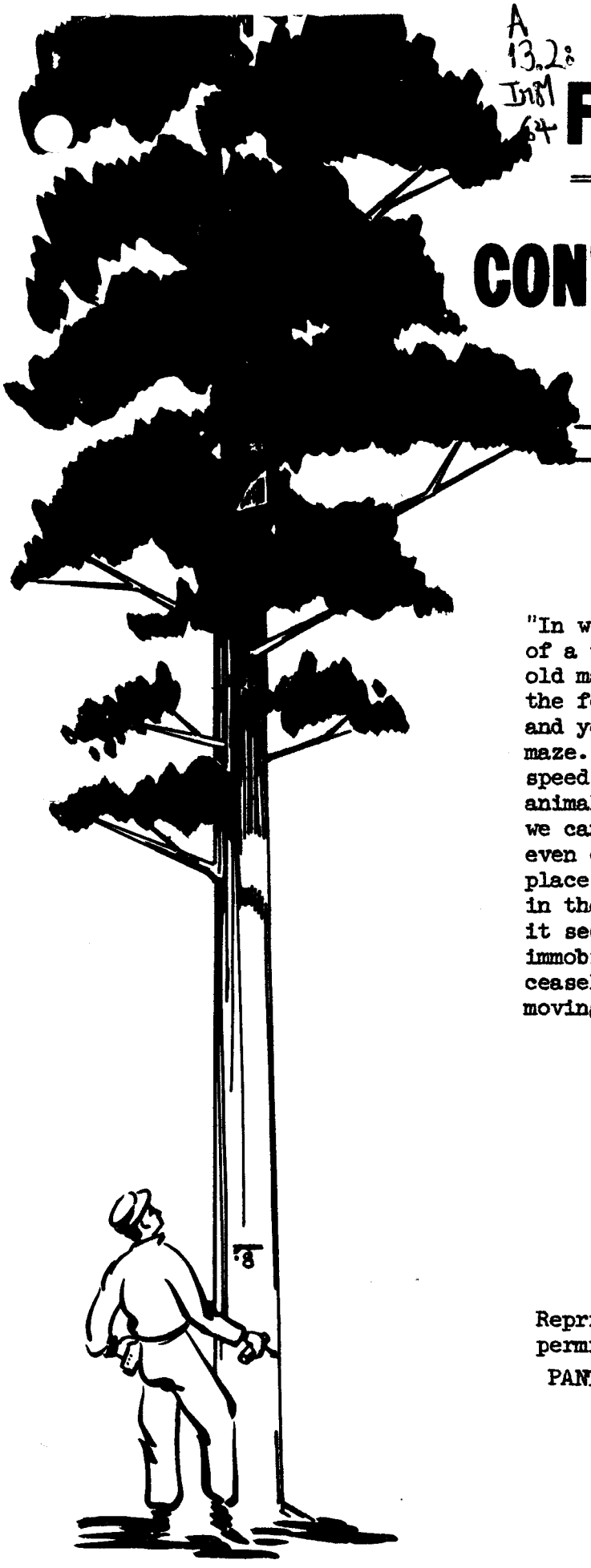

FOREST CONTROL by CONTINUOUS INVENTORY

"Today I have grown taller from walking with the trees."
...Karle Wilson

Milwaukee, Wis. July, 1959 No. 64

FORESTS AND PEOPLE

"In winter, under the snow, the leafless branches of a wood are thin and poor, like the hair on an old man's wart. But in only a few days in spring the forest is transformed, it reaches the clouds, and you can hide or lose yourself in its leafy maze. This transformation is achieved with a speed greater than in the case of animals, for animals do not grow as fast as plants, and yet we cannot directly observe the movement of growth even of plants. The forest does not change its place, we cannot lie in wait for it and catch it in the act of change. Whenever we look at it, it seems to be motionless. And such also is the immobility to our eyes of the eternally growing, ceaselessly changing history, the life of society moving invisibly in its incessant transformations."

Excerpt from "Doctor Zhivago -
Return to Varykino"

By Boris Pasternak

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CAL STOTT

The Lumberjack

THE CALCULATION AND TESTING OF CERTAIN BODY AND TOPWOOD CONVERTING FACTORS

We have had difficulties from time to time providing industrial companies and public agencies with individual tree volume table information for various products and portions of trees. Considerable work has now been done in this field and the time has come to explain in part, the development, testing and application of these data.

The information on convertors and multiplying factors has come largely from bulletins prepared by the Lake States Forest Experiment Station, and applies chiefly to timber in the Lake States. Experimental application of the factors and tables was accomplished on the CFI plots in Stone's Woods near Milwaukee, Wisconsin.

The four most common problems of the past few years in the field of inventory calculations include the determination of:

1. Cord volume of the pulpwood lengths of trees.

2. Cubic foot volume of the pulpwood lengths of trees.

3. Cubic foot volume of the bodywood or sawlog lengths of trees.

4. Cordwood or cubic foot volume of usable topwood above the sawlog length.

A chart covering the test calculations and comparisons of the individual tree volumes in 2" DBH classes, by three methods, is given at the close of this report. These test calculations included the following:

1. The cordwood volume of the pulpwood length computed from the original A and B factors, using the formula and values explained in Newsletter No. 12. Cords were converted to cubic feet at the rate of 79 cubic feet per cord.

2. The cubic foot volume of the pulpwood length computed from A and B factors based on Table 6 in Lake States Forest Experiment Station Bulletin No. 1104 and explained in Newsletter No. 55.

3. The cubic foot volume of the sawtimber length computed from a special table of A and B factors for sawlog trees (to be explained in a subsequent newsletter) and combined with the topwood determined by the cubic foot factors explained in this newsletter.

All these methods require the use of the following formula:

FORMULA

$$Vpcu = [a + (b \times L)] \; SP$$

IN WHICH

a = Individual tree residual volume factor.

b = Individual tree length multiplying factor.

L = Usable length of each tree.

SP = Species correction factor.

Vpcu = Pulpwood volume in gross cubic feet.

Converting for Pulpwood Volume Above Sawlogs -- Topwood Convertors

The factors used to obtain the topwood cubic foot volume of trees, where the sawlog portion of the tree has already been computed in gross International board feet, are applicable for large areas of somewhat mixed timber condition. Topwood factors in cubic feet were developed from Lake States Forest Experiment Station Technical Note #390, which shows that the amount of topwood varies with the sawlog length of the tree, but is not appreciably affected by the diameter breast high. A table of topwood convertors for obtaining the cubic foot volume above sawlog length is attached. The formula for obtaining the cubic foot volume of topwood above sawlogs follows:

FORMULA

$$Vpcu = (Vi) \quad (Ct)$$

IN WHICH

Vi = Gross volume per tree, International board feet.

Ct = Converting factors; topwood above sawlog length.

Vpcu = Volume of usable topwood in net cubic feet.

Accuracy of the Three Methods of Calculating Cubic Foot Volume

The comparative chart on the last page gives a complete picture of the results of the application of the three different methods of computing cubic foot volumes.

THE ORIGINAL CORDWOOD VOLUME TABLE gives slightly lower volumes than the new cubic foot volume table, especially in the small and large diameter classes. TOP AND BODYWOOD VALUES COMBINED give a cubic foot volume roughly corresponding to the other two methods when dealing with trees over the 16" diameter class, but is somewhat lower for trees under 16". In general, 8" and larger trees have an average volume 6.4% higher with the new cubic foot volume table (Newsletter #55) than with the old cord volume table (Newsletter #12). The body and topwood values average 1.3% lower than the old cord volume table.

CONVERTING FACTORS FOR DETERMINING THE NET CUBIC FOOT VOLUME OF TOPWOOD IN SAWTIMBER TREES

SAWLOG USABLE LENGTHS Feet	CUBIC FEET OF TOPWOOD BY SAWLOG LENGTH CLASS Ct factor
4	.1680
6	.1525
8	.1375
10	.1225
12	.1075
14	.0925
16	.0785
18	.0665
20	.0575
22	.0495
24	.0425
26	.0370
28	.0325
30	.0280
32	.0245
34	.0210
36	.0180
38	.0150
40	.0130
42	.0110
44	.0095
46	.0080
48	.0065
50	.0055
52	.0045
54	.0035
56	.0025
58	.0020
60	.0015
62	.0005
64	.0001

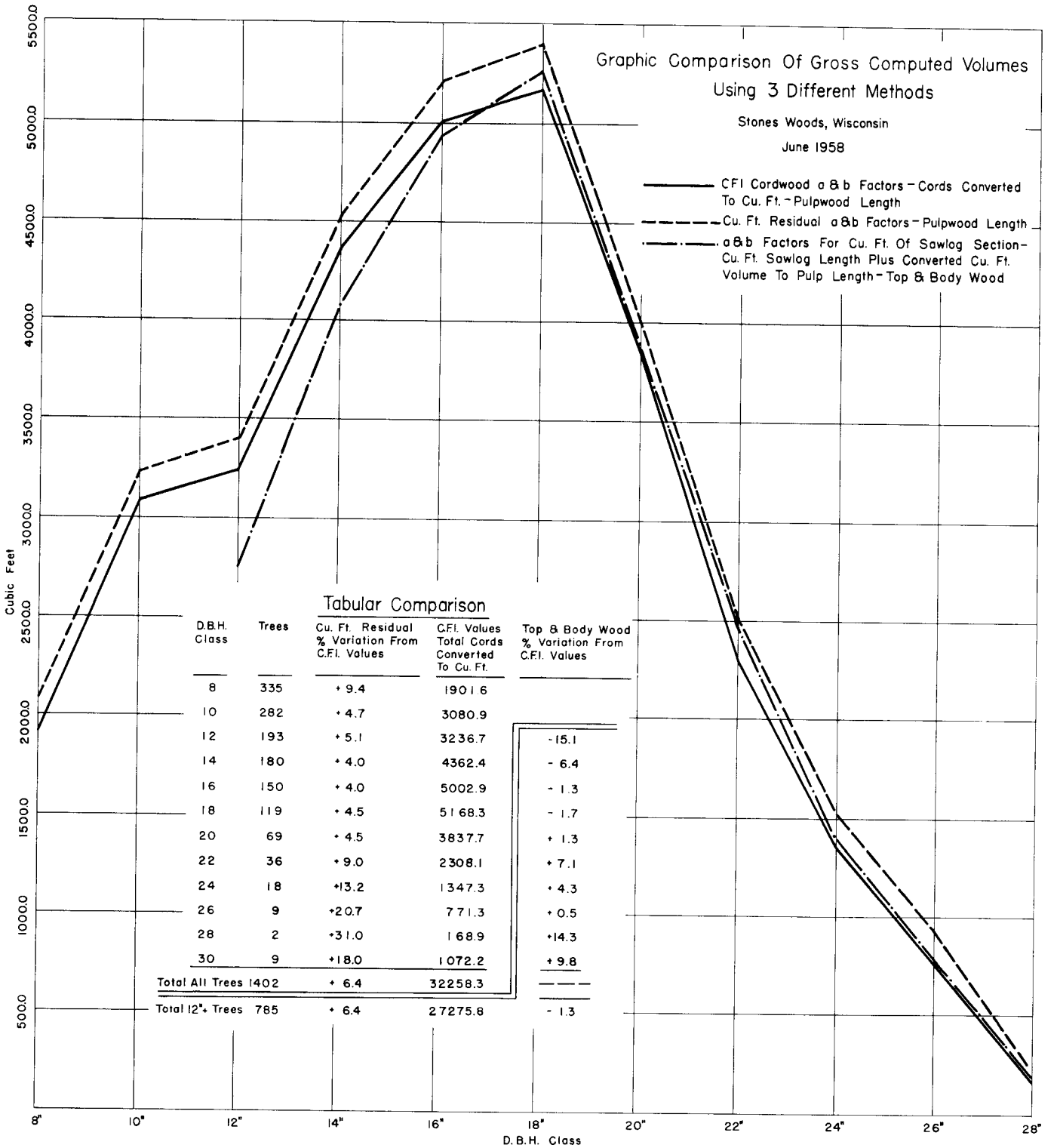
FORMULA:

$$Vpcu = (Vi)\ (Ct)$$

Solution for a 14" tree 20' in usable length:

Vpcu = (90.1 bd. ft. gross) (.0575)

Vpcu = 5.18 cu. ft. of topwood



Tabular Comparison

D.B.H. Class	Trees	Cu. Ft. Residual % Variation From C.F.I. Values	C.F.I. Values Total Cords Converted To Cu. Ft.	Top & Body Wood % Variation From C.F.I. Values
8	335	+ 9.4	1901.6	
10	282	+ 4.7	3080.9	
12	193	+ 5.1	3236.7	-15.1
14	180	+ 4.0	4362.4	- 6.4
16	150	+ 4.0	5002.9	- 1.3
18	119	+ 4.5	5168.3	- 1.7
20	69	+ 4.5	3837.7	+ 1.3
22	36	+ 9.0	2308.1	+ 7.1
24	18	+13.2	1347.3	+ 4.3
26	9	+20.7	771.3	+ 0.5
28	2	+31.0	168.9	+14.3
30	9	+18.0	1072.2	+ 9.8
Total All Trees	1402	+ 6.4	32258.3	
Total 12"+ Trees	785	+ 6.4	27275.8	- 1.3